Epidemiological investigation of a case of chickenpox in a medical college in Kancheepuram, India

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Abstract

Chickenpox is an acute, highly infectious disease caused by human herpesvirus 3. The disease is highly communicable with a secondary attack rate of almost 90%. Secondary cases can occur due to their exposure to the primary case. The main aim of the current epidemiological investigation was to trace the probable source of infection and prevent the emergence of secondary cases. The epidemiological investigation showed that the index case was the primary case as well and that there were no secondary cases because of the immediate isolation of the primary case. This epidemiological investigation reinforced that effective preventive and control measures, if implemented timely for the primary case, can reduce the risk of transmission of infection from case to susceptible contacts and thus prevent the emergence of subsequent secondary cases.

Keywords **Isolation, primary case, varicella.**

Introduction

Chickenpox or varicella is an acute, highly infectious disease caused by human herpesvirus 3.[1] The incidence of varicella in temperate climates is 13-16 cases per 1000 people per year, being highest in children aged 1-9 years old.[2] By contrast, in tropical countries like India, the incidence of varicella is higher in adults.[3] In a study performed among school-aged Greek children, it was observed that 63.6% and 78.6% of 1st and 6th grade children, respectively, were susceptible to varicella infection in their adolescence.[4] Different studies have shown the epidemiologic distribution of varicella in the European nations.[5,6]

Varicella infection is characterized by a vesicular rash that may be accompanied by fever or malaise, for which differential diagnosis can be made with other eruptive diseases.[7,8] It is worldwide in distribution and occurs in both epidemic and endemic forms. Primary infection with the virus causes chickenpox. After the primary infection, durable immunity is established and therefore a second episode of chickenpox would be considered a rare entity. However, recovery from primary infection is commonly associated with establishment of latent infection. When the cell-mediated immunity wanes with age or following immunosuppressive therapy, or in immunocompromised patients, the virus may reactivate resulting in herpes zoster. This reactivation has a completely different clinical outline and can only rarely take the form of a generalized eruption, in cases of severe immunodepression.

In 1998, the World Health Organization (WHO) recommended that routine childhood varicella vaccination be considered in countries where the disease is a relatively important public health and socio-economic problem, where the vaccine is affordable, and where high (85 to 90%) and sustained vaccine coverage can be achieved.[10] Chickenpox primarily occurs in children under ten years of age and is usually self-limiting, but if

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it occurs in adults, it tends to be severe. We discuss a case illustrating an unusual presentation of this known disease and the epidemiological investigation performed to trace the probable source of infection and to suggest and implement timely preventive and control measures to prevent the emergence of secondary cases.

Case report

On August 24, 2012, a 22 year-old female, eighth semester (of nine) MBBS student in Shri Sathya Sai Medical College and Research Institute, Kancheepuram, India, residing at a girls hostel, presented to the hospital with the complaints of cough and common cold having started two days back, followed by the appearance of fever with maculopapular rash. The rash was pleomorphic in nature mainly involving the back and lower limbs. The face, upper extremities, axillae, palms, soles, chest, abdomen and mucosal surfaces were spared from the initial rash. There was also history of generalized body ache and malaise. The lesions started crusting from the fourth day of illness. There was neither history of any contact with a case of chickenpox nor any clinical posting as a part of her curriculum in the departments of Pediatrics or Dermatology. Considering the incubation period of the disease varying from 10 to 21 days, the patient had had clinical posting in Psychiatry and Surgery in the past month before acquiring the infection. The patient gave a history of visit outside the college campus about 10-12 days back. She had not taken chickenpox vaccine in the past.

During admission, she was treated with acyclovir (10 mg/kg body weight, intravenously every 8 hours for 7 days) and cefotaxime (1 g intravenously every 12 hours for 7 days) for the prevention of secondary infections as a standard protocol of the hospital. There were no signs suggestive of immune depression or precarious hygienic conditions. The majority of the lesions regressed in size and number on administration of drugs. She had no complications during the current episode and was discharged after six days of admission. It was totally a clinical diagnosis based on the characteristic morphological pattern of the rash which is seen with chickenpox and no laboratory confirmation was done. The patient gave a past history of chickenpox while in fifth grade in middle school, 12 years back. She had been taken to a doctor by her parents at the time of the previous episode but medical records pertaining to that episode were not available.

In our opinion, the patient had indeed experienced a first episode of chickenpox about 12 years back. No signs of immune depression were present in the patient. Her HIV antibody test was negative. There was no pain associated with the rash and it was definitely not a case of zoster reactivation.

Discussion

Epidemiological investigation

The primary aim of the epidemiological case investigation was to prevent the emergence of secondary cases.

The probable source for acquiring the infection could have been her outside campus visit about 7 days back, prior to the appearance of the illness; there, she could have been exposed to a case of chickenpox. The patient's past history of suffering from chickenpox when she was in the fifth standard appears somewhat unusual as second episodes are rare. The epidemiologist searched for a probable source of infection (case of chickenpox) in the entire campus within the incubation period of the disease, but there was no case of fever with rash in the girls' hostel, boys' hostel, housekeeping staff, civil works laborer, nursing staff, teaching and non-teaching faculties of the medical college, canteen staff and hospital staff. Thus the index case was finally labeled as the primary case of chickenpox. There were no secondary cases in the entire medical college campus after the primary case because of the prevention and control measures which were implemented following the detection of the primary case.

Prevention and control measures

Case: The patient was immediately isolated in a special room to prevent transmission of infection to other susceptible contacts. On the same day, the case was notified to the Health Inspector of the Public Health Department of the Kancheepuram District. She was treated with acyclovir and cefotaxime for a period of seven

days. The patient and the nursing staff were counseled about disinfection of articles soiled by nose and throat discharges.

Contacts: The patient had one close contact in the form of a room-mate who had already suffered from chickenpox in her childhood. She was asymptomatic at the time of investigation and over the incubation period of the disease. The other susceptible contacts included other hostel-mates, hostel housekeeping staff, students residing in the boys' hostel, nursing staff, hospital staff and the labor force; all of them were asymptomatic during the incubation period following the primary case.

Public health interventions

Wardens and housekeeping staff of the girl's hostel and the boy's hostel were sensitized about the signs and symptoms of the disease. They were informed about the importance and the need of immediate reporting of such cases to hospital authorities so that effective preventive and control measures can be implemented at the earliest. They were also directed to report any case of fever with rash identified among the students or the housekeeping staff to the hospital as well as to the epidemiologist in the Department of Community Medicine.

An Information – Education – Counseling session was also conducted for the contractor in-charge of civil works, painting, and a group of 36 laborers. They were informed about the disease symptoms, mode of transmission and need of immediate isolation and reporting to the hospital and the epidemiologist. No similar case was reported in the students, labor workers, security guards, hospital staff and housekeeping staff within the incubation period of the disease.

Simultaneously, a proposal was put forth for voluntary vaccination with varicella vaccine for the high risk groups like college students, hospital or nursing staff, housekeeping staff and laborers.

Conclusion

This epidemiological investigation reinforced that effective preventive and control measures, if implemented timely for the primary case, can reduce the risk of transmission of infection to susceptible contacts and thus prevent the emergence of subsequent secondary cases.

Conflicts of interest All authors – none to declare.

Author contributions SSR gathered the study data and wrote the manuscript. PSS searched for the review of literature. JR supervised the epidemiologic interpretation of the data.

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